LIBRARY
STATE PLANT BOARD

August 1944 E-623

United States Department of Agriculture
Agricultural Research Administration

Bureau of Entomology and Plant Quarantine
and
Bureau of Animal Industry

PREPARATION AND USE OF DUSTS, SPRAYS, WASHES, AND DIPS CONTAINING ROTENONE FOR THE DESTRUCTION OF CATTLE GRUBS

On ranges where cattle grubs, larvae of the heel flies, Hypoderma lineatum (DeVill.) and H. bovis (Deg.), are controlled with treatments of rotenone materials such as derris or cube, stockmen say that the cattle are less annoyed by heel flies than they are on ranges where animals go untreated. Stockmen find, moreover, that treated animals graze more normally than others and that they do not stampede, run, or suffer so much from the mechanical injuries that usually occur during the heel fly season. They also state that the destruction of the grub stage of the heel fly not only reduces annoyance by heel flies during the spring but prevents the cattle from having many grubs the following winter. Feeder animals previously treated for cattle grubs show a gain over the untreated animals of about one-half pound per day.

A hide containing no more than five cattle grub injuries is classed as a No. 1 hide, and this grade brings the highest price. To produce such a hide it is necessary to kill the grubs 2 or 3 months before the animals are to be slaughtered. This allows time for most of the injuries to heal, but small scars are left by the healed cysts. Even these scars can be prevented, however, if effective methods are used to control the grubs.

Such factors as the probable weather, availability of labor, and the numbers of animals to be treated have led to preferences for certain kinds of treatments over others. Stockmen agree, however, that, whatever method is chosen, enough material should be used to insure effective results, that is, to reduce the numbers of grubs to a point that will insure No. 1 hides, the greatest gain in weight, and freedom from annoyance during the heel fly season.

DUSTS

Treatments of cattle for the control of grubs during the last season showed that rotenone-bearing powders, such as derris or cube, are more effective when mixed with finely ground tripoli, volcanic ash, or pyrophyllite than when mixed with sulfur or talc, because the former materials penetrate the hair better, and more animals can be treated with the same amount of rotenone than when sulfur or talc is used as the diluent. They are also less irritating to the respiratory system than dusts containing sulfur.

When the material is applied with a shaker can, at least 3 ounces of the dust mixture is required to cover the back of an animal thoroughly. The can or glass jar should be provided with a closely fitting top, in which about 15 holes, each about 1/4 inch in diameter, are punched outward through the lid. The success of the treatment depends upon the thoroughness with which the powder is worked through the hair and into the grub holes. This is best done by a rotary motion with the finger tips, and not with a straight movement of the flat hand or a brush, which tends to brush the powder away instead of down through the hair.

The first application should be made before the grubs begin to drop, and treatments should be repeated at intervals of 30 days. Usually three treatments are necessary, but in northern localities where both species of grubs occur, or where feeder cattle are received, additional treatments will be needed.

The effectiveness of these mixtures has been found to be in the order in which they are given below:

	Parts by weight
Ground cube or derris	1
Double-ground cream tripoli earth	2
or	
Ground cube or derris	1
Volcanic ash (micronized)1/	2
or	
Ground cube or derris	1
Pyrophyllite (90 percent to pass through a 325-mesh screen)2/	2

1/ The volcanic ash used in the tests is that known commercially as Frianite M3x.

2/ The pyrophyllite used in the tests and found most satisfactory is that commercially known as Pyrax ABB.

The formulas are based on ground derris or ground cube that contains 5 percent of rotenone. The commercial products are allocated on this basis during the war emergency, but the shipments will vary from about 3 percent to more than 6 percent of rotenone. This means that a derris containing 6.64 percent of rotenone should be mixed with 3 parts of the diluent by weight; that one containing 3.32 percent should be mixed with equal parts; and that one containing 4.16 percent should be mixed with 1½ parts. It is important that the material be well mixed, and for this purpose a ball mill is most efficient. Good mixing should give at least 1.5 percent of rotenone in any samples obtained from the mixture.

SPRAYS

Sprays containing ground cube or derris root of the standard commercial grade of fineness are now being used extensively in several States as water suspensions, for quickly treating large herds of beef cattle. The spray is applied with a power-operated orchard sprayer capable of maintaining a pressure of at least 400 pounds at the nozzle. It is equipped with at least 50 feet of high-pressure hose and a trigger-operated spray gun with a 5/64-inch nozzle opening (No. 5 disk). If more powerful sprayers are used, they may be equipped with two leads of hose and two spray guns. Strong but not too violent agitation in the tank is essential to keep the powder in suspension.

For rapid and effective spraying the animals should be confined in an ordinary cattle chute provided with a catwalk for the full length of the chute. The catwalk should be placed high enough to permit the operator who stands on it to reach easily over the top of the chute and apply the spray directly to the backs of the animals. With the nozzle not more than 12 to 16 inches above the animal, there should be a coarse, driving spray that gives a pattern not more than 5 or 6 inches in diameter on the animal. A solid stream applied at high pressure is wasteful and may injure the tissues of the cattle grub cysts, whereas a fine spray will fail to penetrate the long, dense hair usually found on range animals. With proper application, 100 gallons of the spray will treat approximately 125 to 200 animals, depending upon their size and the density of their coats.

Spray Formula

During the 1943-44 season several tests were made in which cube suspensions were applied at 400 to 410 pounds' nozzle pressure to the backs of Hereford yearlings. These tests showed that a high degree of kill was obtained in the treatment of both small and large cattle grubs. The spray penetrated the openings of the smaller cysts, even though they were partly closed with pus and exudate. When the spray was applied at a lower pressure (200 to 250 pounds), the addition of 2 ounces of sodium lauryl sulfate somewhat increased its effectiveness, but it was not so satisfactory as when applied at 400 pounds' pressure. The following formula at 400 pounds' pressure was found satisfactory:

Cube or derris powder (5 percent rotenone) - - 7-1/2 pounds
Water - 100 gallons

With a pressure of 400 pounds or more, sprays containing 5 percent of rotenone from cube powder and wettable sulfur, or from cube powder and a wetting agent, were less effective and more expensive than the simple cube-powder suspension given above.

As soon as cysts are found that contain living grubs, sprays should be applied at intervals of 30 days. Two or three treatments will suffice in the South, but in more northern areas where feeder cattle are received from both Northern and Southern States, more than three treatments will be needed for a good degree of control of the pest.

WASHES

A wash is especially applicable where small herds of range or dairy cattle are to be treated for destruction of cattle grubs, or where power-spraying or dipping facilities are not available.

Consistently satisfactory results are obtained when at least 1 pint of the wash is applied to the back of each animal. This mixture can best be applied from a pint jar having the lid perforated with 15 holes, each about 1/8 inch in diameter. The wash should be thoroughly scrubbed into the hair coat, from the shoulder to the hip, with a hand brush having stiff fiber bristles. The thorough scrubbing removes the dried secretions that accumulate in and around the grub openings in the skin, and permits the mixture to enter the cysts. The thoroughness with which this is done determines largely the effectiveness of this form of treatment.

Rotenone-bearing powder rapidly settles to the bottom of the mixing container. Therefore the wash should be mixed thoroughly, and it should be gently agitated before and during its use to assure a uniform mixture. The following formula is recommended:

Ground cube or derris (5 percent rotenone)	12 ounces
Granular laundry soap	4 ounces
Warm water	1 gallon

DIPS

The dipping method is practicable where large numbers of cattle are to be treated for the destruction of grubs. However, in the interest of the conservation of rotenone-bearing substances, which are critical materials at present, this method is recommended only for large herds and where dipping vats are available. Dipping is best suited for range animals where the winters are not severe. It is advisable to treat dairy cows by one of the other methods

In the dipping vat the animals are held in a swimming position for 2 minutes to insure a thorough wetting of the hair with a concentration of rotenone that is considerably higher than that contained in the spray. In this method the percentage of grubs destroyed compares favorably with that obtained from the use of the standard wash. All lice present on the cattle are killed by this dipping, but eggs of the lice will hatch, and a treatment 16 days later will be required to kill these young. If lice are not a problem, dipping should be done at intervals of 30 days.

The following formula is used for dips:

Ground cube or derris (5 percent rotenone) - -	10 pounds
Wetting agent (sodium lauryl sulfate) - - - -	2 ounces
Water -	100 gallons

Work the powder into a thick paste by repeatedly adding to it small amounts of hot water and stirring it constantly. Thin the paste by adding more hot water, and pour it over the surface of the water in the vat. Then add the wetting agent. The dip is in better condition if it is prepared a few hours before use. Stir it to insure uniform suspension, or use a bucket tied to a rope to agitate the suspension. After the animals begin to go through the vat, their swimming motions will keep the cube or derris powder in suspension.

UNIVERSITY OF FLORIDA
3 1262 09230 3832